



M A G M A C O P P E R C O M P A N Y

FLORENCE PROJECT

July 8, 1995

Ms. Shirin Tolle
Aquifer Protection Project Officer
Arizona Department of Environmental Quality
3033 North Central Avenue
Phoenix, Arizona 85012

15-1899/05

Subject: Magma Copper Company, Florence Project
Monthly Progress Report
June 1995

Dear Ms. Tolle:

Magma Copper Company (Magma) is pleased to provide the June 1995 Progress Report for the Florence Project.

Drilling and Well Installation Progress

A total of 40 wells have been installed: 18 monitoring wells, 9 pumping wells, and 13 observation wells (see Table 1). All of the proposed monitoring wells have been installed. Estimated production, where development has been completed and the depth of each pump location, are shown on Table 1. The estimated production rates are field estimates of water production observed during the initial development and represent an estimate of the anticipated production rates expected for each well.

A full suite of geophysical logs were completed in P19.1-O during June (see Table 2). During June, resistivity and gamma logs were completed in 5 wells: M1-GL, M17-GL, P28.2-O, O28.2-S, and O19-GL. No packer testing activities occurred in June.

Drilling in July is scheduled to include the completion of 10 additional aquifer test wells. Anticipated drilling activities in August include the completion of all scheduled aquifer test wells, and the completion of the vadose zone sampling program.

Sampling Activities

Groundwater samples were collected from 6 newly installed monitoring wells, 2 existing irrigation wells, 3 locations along the irrigation canals, the drill water supply tank, and the underground workings. Laboratory reports are anticipated to be issued by July 14, 1995. This sampling was conducted in accordance with the February 2, 1995 Aquifer Protection Permit (APP) Application Work Plan and subsequent modifications of April 28, 1995. In addition, this sampling was conducted in accordance with the Groundwater Sampling and Analysis Plan submitted to the Arizona Department of Environmental Quality (ADEQ) on June 27, 1995. Groundwater sampling of all monitoring wells is scheduled for the week of July 10, 1995.

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Modeling Activities

Modeling activities during June continue with the input of regional hydrologic data and the calibration of the model to pre-development (circa. 1900) water level data. The guidelines and standards for these modeling activities were submitted to the ADEQ on June 28, 1995. The development of the model for the in-situ mine area incorporates the results of the field investigation program, including preliminary analysis of 3 aquifer tests. A full presentation of the modeling activities is scheduled for July 11, 1995 at 10:00 a.m. at Brown and Caldwell's Phoenix office.

Column testing continued during June at METCON Laboratories in Tucson, Arizona. These tests are anticipated to be completed in late August. X-ray diffraction (XRD) analysis are completed and under evaluation at this time. Final analysis of the XRD data is scheduled for July 21, 1995.

Aquifer Protection/Underground Injection Control (UIC) Permit Activities

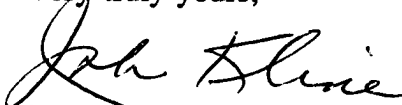
The first quarterly meeting for the APP Application was held on June 1, 1995 and included a review of comments on the April 28, 1995 data submittal. Additional review comments are anticipated during July. During the quarterly APP Application, both packer testing and aquifer testing procedures were reviewed in the field. During June, the ADEQ provided a copy of the new facility assessment spreadsheet in "EXCEL" format to assist with the APP Application.

Additional Activities During June

Three aquifer tests were completed during June: P12-O, PW7-1 (an existing well), and P19.1-O. The duration of each aquifer test was approximately 10,000 minutes. The data from these three tests and the aquifer test completed in June will be available for review in July, 1995.

A Vadose Zone Sampling and Analysis Plan, and a Priority Corehole Plugging and Abandonment Plan were also submitted for review in June. The review of the groundwater model is scheduled for July 11, 1995 in the Brown and Caldwell's Phoenix office at 10:00 a.m. The Florence Project Team looks forward to presenting the initial modeling parameters and current groundwater modeling scenarios to the ADEQ. If you have any questions, please do not hesitate to contact me at (520) 868-5094 or Mr. Steve Mellon at Brown and Caldwell, telephone number (602) 222-4445 or (520) 868-0474.

Very truly yours,



John Kline
Environmental Project Manager

JK:kw
Attachment

cc: Mr. Bruce Gaither, Digital Precision GeoScience
Mr. Steve Mellon, Brown and Caldwell
Mr. Dan Ramey, Magma Copper Company
Mr. Terry Steinborn, Applied Research Associates, Inc.

Table 1. Well Installation Data

| Well Number | Total Depth (feet) | Screen Material | | | | Riser Pipe | | Estimated Production Rate (gpm)* | Depth of Dedicated Pump (feet) |
|-------------|--------------------|-----------------|-------------------|--------------------|-------------------------|------------|----------------------|----------------------------------|--------------------------------|
| | | Type | Diameter (inches) | Slot Size (inches) | Depth (feet) | Type | Diameter (inches) | | |
| M1-GL | 420 | PVC | 5 | 0.08 | 315 to 355 | PVC | 5 | NA | NS |
| M2-GU | 270 | PVC | 5 | 0.08 | 198 to 258 | PVC | 5 | 15 | 180 |
| M3-GL | 370 | PVC | 5 | 0.08 | 298 to 338 | PVC | 5 | 10 | 200 |
| M4-O | 510 | PVC | 5 | 0.08 | 405 to 465 | PVC | 5 | 2 | 200 |
| M5-S | 613 | PVC | 4 | 0.08 | 516 to 576 | LCS | 5 and 4 ^c | Developed | NS |
| M6-GU | 590 | PVC | 5 | 0.08 | 524 to 564 | PVC | 5 | 7.5 | 260 |
| M7-GL | 940 | PVC | 4 | 0.08 | 859 to 919 | LCS | 5 and 4 ^d | 1.1 | 260 |
| M8-O | 1,115 | PVC | 4 | 0.08 | 1,010 to 1,070 | LCS | 5 and 4 ^e | 25 | 260 |
| M9-S | 1,578 | SS | 4 | 0.08 ^f | 1,510 to 1,570 | LCS | 5 and 4 ^g | 0.9 | NS |
| M10-GU | 290 | PVC | 5 | 0.08 | 218 to 258 | PVC | 5 | 40 | 200 |
| M11-GL | 370 | PVC | 5 | 0.08 | 290 to 330 | PVC | 5 | 5 to 10 | 260 |
| M12-O | 510 | PVC | 5 | 0.08 | 420 to 480 | PVC | 5 | 10 | 260 |
| M13-S | 943 | PVC | 5 | 0.08 | 851 to 911 | LCS | 5 | Developed | NS |
| M14-GL | 950 | PVC | 5 | 0.08 | 778 to 838 | LCS | 5 | 5 to 10 | 260 |
| M15-GU | 630 | PVC | 5 | 0.08 | 554 to 594 | LCS | 5 | 20 | 260 |
| M16-GU | 690 | PVC | 5 | 0.08 | 598 to 658 | PVC | 5 | NA | NS |
| M17-GL | 1,132 | PVC | 5 | 0.08 | 938 to 998 | LCS | 5 | NA | NS |
| M18-GU | 240 | PVC | 5 | 0.08 | 178 to 218 | PVC | 5 | NA | NS |
| O3-GL | 395 | PVC | 5 | 0.08 | 325 to 365 | PVC | 5 | 30 | NS |
| P5-O | 800 | PVC | 6 | 0.08 | 414 to 770 ^h | PVC | 6 | Developed | NS |
| O5.1-O | 880 | PVC | 4 | 0.08 | 672 to 832 | LCS | 5 and 4a | Developed | NS |
| O5.2-O | 880 | PVC | 4 | 0.08 | 712 to 771 | PVC | 4 | Developed | NS |
| P12-O | 999 | PVC | 6 | 0.02 | 440 to 940 | PVC | 6 | 70 | NS |
| O12-O | 970 | PVC | 4 | 0.08 | 434 to 929 | PVC | 4 | Developed | NS |
| O12-GL | 395 | PVC | 5 | 0.08 | 325 to 365 | LCS | 5 | 40 | NS |
| P15-O | 1,380 | PVC | 6 | 0.08 | 550 to 1,300 | PVC | 6 | NA | NS |
| O15-O | 1,330 | PVC | 4 | 0.08 | 550 to 1,300 | PVC | 4 | NA | NS |

Table 1. Well Installation Data

| Well Number | Total Depth (feet) | Screen Material | | | | Riser Pipe | | Estimated Production Rate (gpm) ^a | Depth of Dedicated Pump (feet) |
|-------------|--------------------|-----------------|-------------------|--------------------|-------------------------|------------|-------------------|--|--------------------------------|
| | | Type | Diameter (inches) | Slot Size (inches) | Depth (feet) | Type | Diameter (inches) | | |
| P19.1-O | 630 | PVC | 6 | 0.08 | 402 to 602 | PVC | 6 | NA | NS |
| P19.2-O | 630 | PVC | 6 | 0.08 | 404 to 604 | PVC | 6 | NA | NS |
| O19-O | 630 | PVC | 4 | 0.08 | 410 to 610 | PVC | 4 | NA | NS |
| O19-GL | 460 | PVC | 5 | 0.08 | 375 to 435 | PVC | 5 | NA | NS |
| P28.1-O | 510 ⁱ | PVC | 6 | 0.08 | 395 to 495 ⁱ | PVC | 6 | NA | NS |
| P28.2-O | 510 ⁱ | PVC | 6 | 0.08 | 395 to 495 ⁱ | PVC | 6 | NA | NS |
| O28.1-O | 530 | PVC | 4 | 0.08 | 395 to 495 | PVC | 4 | NA | NS |
| O28.2-S | 510 | PVC | 4 | 0.08 | 454 to 494 | PVC | 4 | NA | NS |
| P39-O | 915 | PVC | 6 | 0.08 | 471 to 826 | PVC | 6 | Developed | NS |
| O39-O | 916 | PVC | 5 | 0.08 | 474 to 890 | PVC | 5 | Developed | NS |
| P49-O | 1,288 | PVC | 6 | 0.08 | 807 to 1,222 | PVC | 6 | NA | NS |
| O49-O | 1,280 | PVC | 4 | 0.08 | 832 to 1,232 | PVC | 4 | NA | NS |
| O49-GL | 740 | PVC | 5 | 0.08 | 660 to 720 | LCS | 5 | NA | NS |

^a Preliminary data collected during development only.

^b Tapered riser pipe from 5-inch to 4-inch casing at 494 feet below the ground surface (bgs).

^c Tapered riser pipe from 5-inch to 4-inch casing at 516 feet bgs.

^d Tapered riser pipe from 5-inch to 4-inch casing at 593 feet bgs.

^e Tapered riser pipe from 5-inch to 4-inch casing at 591 feet bgs.

^f Wire wrap screen.

^g Tapered riser pipe from 5-inch to 4-inch casing at 502 feet bgs.

^h Screen interval contains 220 feet of slotted screen and 140 feet of blank casing because of material shortages. Location of blank casings were placed in areas of lower permeability as determined by the geophysical logs.

ⁱ Approximate depth.

gpm = gallons per minute

LCS = low carbon steel

NS = not set

PVC = polyvinyl chloride

NA = not available

SS = stainless steel

| Table 2. Geophysical Logs | | | | | | | | | | | |
|---------------------------|--------------------|-------------------------|-------------|------|---------|-------------|-------|---------|---------|-------|--------------------------------|
| Hole Number | Total Depth (feet) | Type of Geophysical Log | | | | | | | | | |
| | | TV-3D | Resistivity | S.P. | Caliper | Temperature | Gamma | Neutron | Density | Sonic | Spinner |
| O5.1-O | 880 | NP | ✓ | ✓ | ✓ | NP | ✓ | ✓ | ✓ | ✓ | |
| O5.2-O | 880 | NP | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | NP | ✓ | |
| P12-O | 999 | NP | ✓ | ✓ | ✓ | NP | ✓ | ✓ | ✓ | ✓ | Reverse Circulation |
| O12-O | 970 | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| O12-GL | 395 | NP | NP | NP | ✓ | NP | NP | NP | NP | NP | Backfill Quantities |
| P15-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| O15-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| P19.1-O | ✓ | ✓ | ✓ | ✓ | NP | ✓ | ✓ | ✓ | NP | ✓ | ✓ |
| P19.2-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| O19-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| O19-GL | NP | NP | ✓ | NP | NP | NP | ✓ | NP | NP | NP | |
| P28.1-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| P28.2-O | NP | NP | ✓ | NP | NP | NP | ✓ | NP | NP | NP | |
| O28.1-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| O28.2-S | 1,510 | NP | ✓ | NP | NP | NP | ✓ | NP | NP | NP | |
| P39-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| O39-O | 916 | NP | ✓ | ✓ | ✓ | NP | ✓ | ✓ | ✓ | ✓ | Reverse Circulation |
| P49-O | 1,280 | NP | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | NP | ✓ | Clay Seam in Gila Conglomerate |
| O49-O | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |
| O49-GL | NP | NP | NP | NP | NP | NP | NP | NP | NP | NP | |

| Table 2. Geophysical Logs | | | | | | | | | | | |
|---------------------------|--------------------|-------------------------|-------------|------|---------|-------------|-------|---------|---------|-------|--------------------------------|
| Hole Number | Total Depth (feet) | Type of Geophysical Log | | | | | | | | | |
| | | TV-3D | Resistivity | S.P. | Caliper | Temperature | Gamma | Neutron | Density | Sonic | Spinner |
| MCC-537 ^b | 1,207 | ✓ | ✓ | ✓ | ✓ | NP | ✓ | ✓ | NP | ✓ | |
| MCC-540 ^b | 1,176 | ✓ | ✓ | ✓ | ✓ | NP | ✓ | ✓ | NP | ✓ | |
| MCC-541 ^b | 1,031 | ✓ | ✓ | ✓ | ✓ | NP | ✓ | ✓ | NP | ✓ | |
| MCC-544 ^b | 1,320 | ✓ | ✓ | ✓ | ✓ | NP | ✓ | ✓ | NP | ✓ | |
| MCC-533 ^a | 1,073 | ✓ | ✓ | ✓ | ✓ | NP | ✓ | ✓ | NP | ✓ | |
| | | | | | | | | | | | Comments |
| | | | | | | | | | | | Clay Seam in Gila Conglomerate |
| | | | | | | | | | | | Fracture Orientations |
| | | | | | | | | | | | Fracture Orientations |
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^a 6-inch core hole

^b HX core hole

NP = not planned